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Claims

1. Transmitting device for transmitting signals in a wireless orthogonal frequency division multiplex (OFDM) communication system with space time transmit diversity (STTD), comprising

encoding means (2) for encoding a data stream on the basis of a STTD scheme and outputting a first and a second STTD encoded data stream,

a first (5) and a second (6) antenna means for transmitting the data of said first and said second data stream, respectively, in OFDM signals, said first (5) and said second (6) antenna means being arranged spaced apart from each other in a space diversity arrangement,

pilot symbol generating means (2) for generating pilot symbols to be transmitted among said data of said first and second data stream, whereby first pilot symbols are transmitted via said first antenna (5) and second pilot symbols are transmitted via said second antenna (6), some of said second pilot symbols being orthogonal to corresponding ones of said first pilot symbols.

2. Transmitting device according to claim 1,
characterized in,
that corresponding first (20; 21) and second (42; 43) pilot symbols have the same frequency and time allocation in the OFDM system.

3. Transmitting device according to claim 2,
characterized in,
that corresponding first and second pilot symbols having the same frequency and time allocation are alternatively identical (20; 42) and orthogonal (21; 43) to each other in the frequency as well as in the time dimension.

4. Transmitting device according to claim 1, 2 or 3,
characterized in,
that pairs of first (20; 21) pilot symbols being adjacent in the time dimension are respectively orthogonal to the corresponding pairs (42; 43) of second pilot symbols.

5. Transmitting device according to one of the claims 1 to 5,
characterized in,

that pairs (20; 23) of first pilot symbols being adjacent in the frequency dimension are respectively orthogonal to the corresponding pairs (40; 46) of second pilot symbols.

6. Transmitting device according to one of the claims 1 to 5 ,
characterized in,
that the first and the second pilot symbols have a regular distribution in the time and the frequency dimension, whereby the second pilot symbols alternately have the identical and the inverse complex value of the corresponding first pilot symbol in the time as well as in the frequency dimension.

7. Base station (1) of a wireless orthogonal frequency division multiplex (OFDM) communication system, comprising a transmitting device according to one of the claims 1 to 6.

8. Receiving device for receiving signals in a wireless orthogonal frequency division multiplex (OFDM) communication system with space time transmit diversity (STTD), comprising
a single antenna means (11) for receiving STTD encoded signals transmitted from a first (5) and a second (6) space diversity antenna means of a transmitting device of the OFDM communication system, said first (5) and said second (6) space diversity antenna means transmitting corresponding pilot symbols in said STTD encoded signals, whereby at least a part of the pilot symbols transmitted from the second antenna means (6) is orthogonal to corresponding pilot symbols transmitted from the first antenna means (5),
processing means (24) for detecting pilot symbols in the received STTD encoded signals, for processing detected pilot symbols and performing a channel estimation on the basis of said processing to separately determine the transmission quality of STTD encoded signals transmitted from said first (5) and said second (6) antenna means, respectively.

9. Receiving device according to claim 8,
characterized in,
that said first (20; 21) and second (42; 43) pilot symbols transmitted from said first and second antenna means have the same frequency and time allocation in the OFDM system and are alternatively identical (20; 42) and orthogonal (21; 43) to each other in the frequency as well as in the time dimension, whereby adjacent pairs of pilot symbols are processed to determine the transmission quality.

10. Receiving device according to claim 8 or 9,
characterized in,

that the second pilot symbols alternately have the identical and the inverse complex value of the corresponding first pilot symbol in the time as well as in the frequency dimension so that the processing and the channel estimation is performed on the basis of an addition and a subtraction calculation of received pilot symbols.

11. Receiving device according to claim 10,
characterized in,
that, on the basis of the channel estimation result, either the STTD encoded signals from the first antenna means (5) or from the second antenna means (6) are further processed.

12. Mobile terminal of a wireless orthogonal frequency division multiplex (OFDM) communication system, comprising a receiving device according to one of the claims 8 to 11,

13. Channel estimation method for performing a channel estimation in a wireless orthogonal frequency division multiplex (OFDM) communication system in which a transmitting device comprising a first and a second antenna transmits signals with space time transmit diversity (STTD), said first and said second antenna means being arranged spaced apart from each other in a space diversity arrangement, comprising the steps of
transmitting first and second pilot symbols via said first and said second antenna means, respectively, some of said second pilot symbols being orthogonal to corresponding ones of said first pilot symbols,
receiving said pilot symbols in a single antenna of a receiving device,
processing received pilot symbols and performing a channel estimation on the basis of said processing to separately determine the transmission quality of STTD encoded signals transmitted from said first and said second antenna means, respectively.

14. Channel estimation method according to claim 13,
characterized in,
that said first and second pilot symbols transmitted from said first and second antenna means have the same frequency and time allocation in the OFDM system and are alternatively identical and orthogonal to each other in the frequency as well as in the time dimension, whereby adjacent pairs of pilot symbols are processed to determine the transmission quality.

15. Channel estimation method according to claim 13 or 14,
characterized in,

that the second pilot symbols alternately have the identical and the inverse complex value of the corresponding first pilot symbol in the time as well as in the frequency dimension so that the processing and the channel estimation is performed on the basis of an addition and a subtraction calculation of received pairs of pilot symbols.

16. Channel estimation method according to claim 13, 14 or 15,
characterized in,
that, on the basis of the channel estimation result, either the STTD encoded signals from the first antenna means or from the second antenna means are further processed in the receiving device.